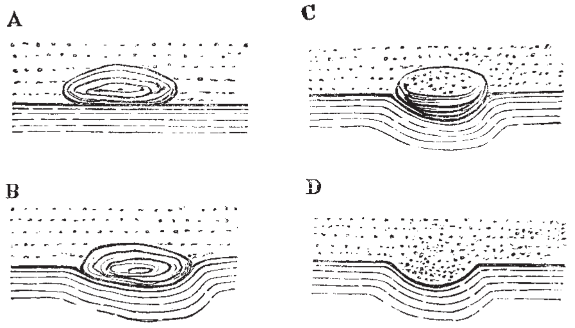
stance to resist pressure, but destined in the long run to decompose, would, if resting on the sea-bottom, become covered with sand or silt, if such deposit were taking place. (*a.*) As the weight increased above, its under-surface would become pressed into the bed upon which it chanced to be resting. (*b.*) As it decomposed, infiltrated sediment would replace the organic matter (*c.*), until finally the decomposition being complete, the sediment from above entirely fills in the space, leaving on the under-surface a reproduction in semi-relief of the decayed organism, while the upper part is merged in the sand.



(*d.*) Instances of this form of fossilisation are by no means rare, but cases in which all carbonaceous matter has disappeared from vegetable impressions are still more common, especially with sea-weeds, which, as M. Grand 'Eury has remarked, decompose into a semi-fluid gelatinous matter when imbedded in mud. Nor does the destruction of carbon cease when the mass they are buried in becomes consolidated, for percolating water brings oxygen to them, which slowly destroys every remaining vestige of organic matter.

The author is careful in the present work only to select specimens for illustration about which little or no reasonable doubt can exist. Commencing with impressions from the Tertiaries of almost existing species of sea-weed, he compares these with the more doubtful secondary Chondrites. The Chondrites of the Flysch, strongly impregnated as they are with carbonaceous matter, are admitted on all hands to be Algæ, and the author asks how the same origin can be denied to casts of specifically identical Chondrites of the Cretaceous, and so on to the Liassic forms. The algous nature of most of those selected for illustration is indeed so obvious that no shadow of doubt respecting them can exist. The gigantic Liassic Laminarias with reticulated structure are more problematic, but it seems at least highly improbable that any movements of invertebrata could have produced such markings. The Alectoruridæ, an extinct group of algæ which existed from the Silurian into the Tertiaries, and their equally extinct ally Glossophycus, whose vegetable nature is even more apparent, may challenge reasonable criticism on account of their divergence from recent algæ. While the algous nature of these, and many other types, is maintained, the author does not hesitate to acknowledge that many forms which it was previously considered might be algæ, are probably tracks of invertebrates. He simply holds that Dr. Nathorst's generalisations are far too sweeping, and in many cases utterly against the evidence. The true nature of Bilobites, however, is still open to some question. They are always preserved in semi-relief, a process explained above, but the arguments, while abundantly proving that they cannot be due to tracks of invertebrates, fall short of absolute proof that they must be Algæ, and can be nothing else. In like manner the Eophyton of the Lower Cambrian, alleged by Nathorst to be furrows made by moving sea-weed on a muddy bottom, is almost proved by its occasionally cylindrical form and interlacing fragments, and wholly confined as it is to this most ancient formation, to be something more than mere scratches upon ooze, however produced, yet the evidence does not prove conclusively that it is a plant. The discussion has at least produced two most valuable works, the one serving to show how even the most accomplished palæophytologists may be deceived in dealing with so perilous a subject as fossil algæ, and the other proving that in spite of numerous errors, there is a considerable basis of truth in even the most speculative branch of their science. J. S. G.

NOTES

WITH reference to the scheme of the Grocers' Company for the encouragement of sanitary research, it is stated that so far as the administration of the scheme will involve scientific considerations, the Court proposes to act with the advice of a committee of eminent scientific men, and the following gentlemen have consented to form the first committee:—Messrs. John Simon, C.B., F.R.S., John Tyndall, F.R.S., John Burdon Sanderson, M.D., F.R.S., and George Buchanan, M.D., F.R.S.

A PRIVATE test took place on Monday of a telephone between New York and Chicago, a distance of 1000 miles, and the result was a complete success. Previously the longest distance over which a telephonic message had been sent was 700 miles, between New York and Cleveland. The present result is not due solely to the telephone, although that possesses some novelty, but is mainly due to a novelty in the conductor. This consisted, it is stated, of a steel wire core, copper plated, the electrical resistance of which to Chicago was only 1522 ohms. This new achievement is regarded as marking a new era in the development of telephonic communication.

AFTER assuming threatening proportions, the eruption of Mount Etna has almost subsided. Eleven new fissures had opened on the side of the mountain, giving out smoke, scoriæ, and showers of small stones, accompanied by a rumbling sound, and a trembling of the earth. Strong shocks of earthquake were felt at various parts of the surrounding country, and crevices were formed in the earth. A telegram from Prof. Silvestri, dated the 25th, states that the eruption is without importance and seems ceasing. Later news on Monday night states that there is still cause for some uneasiness in respect to Etna. The lava has not flowed, but has formed a new cone. On Monday strong shocks of earthquake were felt at Pedara, and slight ones at Catania. The site of the present eruption is further down the mountain than any previous eruption in modern times, and it is the first eruption which has occurred on the southern side of the mountain for more than a century.

WE regret to record the loss to science of a gifted and energetic young worker through a gun accident. A telegram from Hong Kong informs us that Mr. Frank Hatton, mineralogist and scientific explorer for the British North Borneo Company was killed by the accidental discharge of his gun while hunting in the jungle. The deceased gentleman was the only son of Mr. Joseph Hatton, and gave promise of a brilliant and useful scientific career. He was a student of the Royal School of Mines, South Kensington, where he distinguished himself by the extraordinary rapidity and accuracy with which he worked through the course of studies in that institution. He was especially distinguished in the Chemical Section, in which he made and published some valuable researches on Bacteria, &c., for which he obtained the Frankland prize of the Institute of Chemistry, entitling him to the degree of Associate. Mr. Hatton had great linguistic aptitude, and this, with a considerable amount of natural tact, contributed much to his success in dealing with the natives of Borneo during his exploring expeditions for the Company. During the last eighteen months he has explored the greater part of the Company's dominion, an area about as large as France, without losing a man, and in regions in which in many cases he was the only individual able to speak the Malay and Dusun dialects. A large number of scientific observations and notes on climate, geology, &c., of Borneo made during these expeditions will probably be published. Mr. Hatton, who had scarcely attained his twenty-second year at the time of his death, was a Fellow of the Chemical Societies of London and Berlin and of the Asiatic Society.

THE Gothenburg Museum will be represented at the coming Fisheries Exhibition by a magnificent selection of exhibits from its Zoological Section, the expenses of which will be borne by Dr. Oscar Dickson. This collection will be selected, arranged, and taken care of to London by Dr. A. H. Malm of that Museum. The collection will consist of the choicest gems of the Museum, among which are five rare species of whales, and the ichthyological fauna of the province of Bohus, as well as the well-known collection of herrings of various kinds and from different countries belonging to the Museum. There will also be sent a collection of skeletons of the fishes and birds comprising the fauna of Southern Sweden. The entire selection made by Dr. Malm is remarkable for its scientific accuracy, as well as finish. He will also show privately a splendid collection of Mollusca from the Cattegat.

THE Commission, consisting of Baron Nordenskjöld, Consul Elfwing, and Prof. Gyldén, which the Royal Swedish Geographical Society had appointed to report on the question of an international meridian and a common time, has come to the conclusion that it would undoubtedly be a matter of great difficulty to decide as to the former on account of national jealousies, but it has offered a solution of the latter question which is worthy of notice. If the Greenwich meridian is fixed on as the common one, it would strike a point 180° from Greenwich, east of New Zealand, and if another circle is drawn 90° from Greenwich, its western half would nearly touch New Orleans, and its eastern a point a few minutes east of Calcutta. This system would furnish four cardinal times, viz. one European, one American, one Asiatic, and one Oceanic. As it would however be necessary to find several mean times for Europe, Prof. Gyldén proposes that twelve meridians be drawn from Greenwich, which he numbers at intervals of 2½°, which will make the time of the places falling under each differ from those under the nearest meridian by 10 minutes of actual time. These meridians as numbered would either touch the places mentioned below, or fall so near them that the actual difference would be of no consequence. The difference of time from 10m. is however shown in the parentheses: No. 1, Paris (40s.); No. 2, Utrecht and Marseilles (1m. 29s.); No. 3, Bern (16s.) and Turin (42s.); No. 4, Hamburg (6s.), Altona (14s.), Gottingen (14s.), and Christiania (2m.); No. 5, Rome (50s.), Leipzig (26s.), and Copenhagen (20s.); No. 6, Sweden (15s. from common mean time); No. 7, Brieg (Prussia); No. 8, Königsberg (2m.); No. 9, Åbo (1m.) and Mistra (Greece) (5s.); No. 11, no place of importance; No. 12, St. Petersburg (1m. 14s.), and Kiev. Further east it is not suggested to carry the system. Should the various European countries decide on adopting the mean time of the nearest meridian they might be arranged as follows:—No. 1 for France; No. 2 for Holland and Belgium; No. 3 for Switzerland; No. 4 for Norway and Western Germany; No. 5 for Denmark, Central Germany, and Italy; No. 6 for Sweden and Austria; No. 7 for Eastern Germany; No. 8 for Hungary; No. 9 for Poland and Greece; No. 10 for Finland, Roumania, and Bulgaria; No. 11 for Turkey; No. 12 for Eastern Russia. West of Greenwich No. 1 would serve for Spain, and No. 3 for Portugal. By this system Prof. Gyldén thinks it would be a simple matter for every one to remember that the difference between two meridians, as, for instance, between London and Paris, was exactly 10 minutes. Prof. Gyldén also suggests that, for the convenience of travellers and others, all public clocks should be provided with coloured rings showing the differences of time between the various meridians.

THIS winter, at a large number of private and official *soirées* in Paris, the electric light has been used from storage batteries in a very simple manner. The accumulators are carried in a vehicle which is stationed in front of the house, and electric wires are conducted into the building through the windows. Incandescent lamps are placed in the ordinary candelabras, and the fitting of the most complex lighting is an affair of a very few hours.

THE new Elphinstone-Vincent dynamo machine was shown the other evening to a large party of visitors at Messrs. Unwin's printing offices; 411 Swan incandescent lights of twenty candle-power being well sustained by an engine of not at all large dimensions. The exhibition seems to show that the Elphinstone-Vincent machine in its present form of maturity is one of considerable merit. Its most notable feature is that the armature works between both external and internal magnets, that the saddles of wire of which the armature is formed constitute a very simple construction, that there is close proximity in the working parts to the magnets, and that, all the parts of the machine being duplicated, taking to pieces and repairing can be most readily effected.

THE Commissioners on Technical Education—Mr. Woodall, M.P., Mr. Samuelson, M.P., Mr. Wyer Smith, and Mr. Magnus, with Mr. Redgrave, secretary—paid a flying visit to Edinburgh last week. They visited, we understand, the Watt Institute—where they were received by Prof. Fleeming Jenkin and Lord Shand, to whom they expressed themselves highly satisfied with the tuitional and other arrangements of the Institute—the Museum of Science and Art, and Heriot's Hospital. One half of them afterwards inspected the Merchant Company's Schools, and the other half several of the Board Schools.

THE Surveying Expedition, under the direction of M. de Lesseps, has left Hamma, Tunis, and visited the mouth of the Oued Melah, which is to form the outlet of the projected Inland Sea Canal. It is declared that the result of the investigations shows that the cutting of the earth may be accomplished without difficulty.

M. COCHERY, the Minister of Postal Telegraphy, presided over the first monthly dinner of French Electricians, which is to take place on the 21st of every month, at the Café Durand. English electricians wishing to join should communicate with the director of *L'Électricité*, 16, Rue du Croissant, Paris. The president of the meeting for April 21 will be M. Berger, ex-director of the Electrical Exhibition of 1881.

A TELEGRAM from Copenhagen states that "volcanic ashes" have fallen in the neighbourhood of Trondhjem, Norway, and that a serious eruption of Mount Hecla is therefore supposed to have taken place. If these "ashes" are the dust referred to in our note last week (p. 496), then they are not of a volcanic character, according to the examination of Dr. H. Reusch of Christiania University. On this subject a Glasgow correspondent writes:—"My son, who is a passenger by the P. and O. steamer *Deccan* to the East, writes on February 27, when the steamer was in the Red Sea: 'Nothing of note occurred till evening, when G. and myself determined to sleep on deck, on account of the heat. We accordingly did so, and retired to our bunks about 4 a.m. . . . During our sleep on deck we were much annoyed by a quantity of small particles of dust which covered our faces, pillows, &c., and indeed was spread all around. . . . I am convinced it must have been a shower of lava dust, which, it is well known, is often carried hundreds of miles from the crater where it has origin. The dust was of hard particles. I am convinced that lava dust it was, but can get no one to coincide with my opinion.' Can this be a relation to the Norway dust? I see your Norway note says the wind blew strongly from north-north-west, which would bear towards the Red Sea."

M. NAPOLI, electrician to the French Great Eastern Railway, has published in the *Aëronaut* an article showing that electricity supplies a less ponderous motive power than steam for propelling balloons. He supposes that 3230 grammes of material is enough to generate, by means of Bunsen elements, an electric current able to give with a Gramme machine of a convenient construction one horse-power working during an hour.

ON the evening of February 28, at 8·40 p.m., two travellers sledging over the Lesjö, a remote lake in Värmland, in Sweden, saw a meteor of remarkable size and lustre fall about a mile off. Their backs were turned at the time of its appearance, but its luminosity was so strong that the whole country round was illuminated, and when they turned its brilliancy blinded them for a few seconds. Its track was marked by a vivid band, to the eye one foot broad and three yards long, of a yellowish colour. The meteor, after about five seconds, burst with a shower of sparks of the same colour before striking the earth. The night was perfectly clear.

THE Swedish Chamber of Agriculture has granted a Mr. A. Carlsson 50*l.* for the practical study of English agriculture during the coming season.

IT is undoubted that Gramme was the first to construct a dynamo-electric machine with continuous induction, using (independently of Pacinotti) a ring-armature similar to Pacinotti's ring. But regarding the question, who it was that first produced continuous dynamo electric currents, and so was the first to combine experimentally the principles of Siemens and Pacinotti, Prof. von Waltenhofen offers proof (*Wied. Ann.* No. 2) that this priority belongs to Prof. Pfaundler of Innsbruck. In 1867 Herr Kravogl of Innsbruck showed his electromagnetic motor at the Paris Exhibition; this consists of coils forming a hollow ring which rotates round a horizontal axis, while it incloses a bent cylindrical rod tending by weight to take the lowest position, but kept suspended in a certain raised position by currents in the coils, whereby also the ring is rotated. In a letter on this machine in 1867 Prof. Pfaundler proposed to apply Siemens's principle to it, and get electric currents from mechanical work of rotation (the battery being included at first with a shunt, then quite excluded). This he tried and effected about three years later, as a letter dated February 11, 1870, records. Thus Pfaundler seems to have produced continuous dynamo-electric currents before Gramme, and to have indicated the possibility of getting such currents from the Kravogl ring machine in the same year (1867) as Siemens's invention of dynamo-electric machines acquired publicity.

THE Committee of the Annonay Montgolfier celebration have already collected 60,000 francs, and subscriptions are pouring in. They have decided upon the publication of a special organ, of which the first number will be issued in a few days. The celebration will consist in the erection of a statue to the two brothers, several ascents, the sending up of a Montgolfier similar to the original one, and a cavalcade representing the provincial officials, who witnessed the proceedings on June 5, 1783.

IT seems to result from recent researches by A. W. Pehl, brought before the Russian Chemical Society, that the poisonous action of the ergot, the bad effects of which are so often witnessed in Russia, is due to putrefaction poisons called ptomaines, which appear during the decomposition of the albuminoids in flour. The ergot, that is the sclerotium of the small mushroom, *Claviceps purpurea*, has energetic peptic qualities and thus would directly contribute to the formation of ptomaines in the flour.

WE have received the last number of the Caucasian *Izvestia*, which appeared at Tiflis on February 24. It contains several interesting papers; M. Stebnitzky contributes a paper on the measurements by Parrot, in 1829, of the seconds pendulum on the Great Ararat, and, introducing all necessary corrections for rendering them comparable with recent measurements, he arrives at the result that the length of the pendulum at the monastery of St. Jacob on the Ararat is 440·1613 Paris lines. The anomaly would be thus equal to 7·7 swings per day, and corresponds to an elevation of geoide on the normal spheroid of 855 metres. Compared with Tiflis (1343 metres), this diminution of gravity would point out the existence of great cavities in the Ararat. We notice also a paper on the changes of height of the level of the Caspian Sea, by M. Filipoff; measurements of heights in the villayet of Trapezunt; complementary notes to the formerly-published anthropological measurements, by M. Erxert; and a summary of the first part of M. V. Miller's researches on the Osetian language. In the bibliographical part we find an interesting sketch of the climate of the Caucasus, on the ground of the meteorological observations published by Dr. H. Wild in his work, "Die Temperatur-Verhältnisse des Russichen Reichs," and a report, by M. Zagursky, on Baron Uslar's posthumous work on the Tabasatan language; it is a serious work, containing a very elaborate grammar of the language, a list of words, and a chestomathy. The same fascicule contains the necrologies of Dr. Land and Count Sollogoub, and a variety of notes. In the appendix we find a translation of Mr. Palgrave's reports on Anatolia and Lazistan, which are considered as the more reliable with regard to population.

A SERIES of shocks, lasting several seconds, believed at present to be due to earthquake, were felt at Amsterdam at 5 a m. on March 17. The movement was in a vertical direction, and caused mirrors and other pendent articles of furniture to oscillate.

THE additions to the Zoological Society's Gardens during the past week include a Common Wigeon (*Mareca penelope* ♂), British, presented by Lieut.-Col. C. Birch Reynordson; three Sirens (*Siren lacertina*) from South Carolina, presented by Mr. G. E. Manigault; six Common Squirrels (*Sciurus vulgaris*), British, a Lemur (*Lemur* ——) from Madagascar, two Robben Island Snakes (*Coronella phocarum*) from Robben Island, South Africa, purchased; a Gayal (*Bibos frontalis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THE COMET 1883 *a*.—From elements calculated by Dr. Hepperger of Vienna upon observations extending from Feb. 24 to March 4, the following ephemeris for midnight at Berlin results:—

	R.A.	Decl.	Distance from	
	h. m. s.	° ′	Earth.	Sun.
March 30	3 29 24	+21 49·2	1·497	1·073
31	3 33 59	21 19·5		
April 1	3 38 25	20 50·3	1·536	1·098
2	3 42 44	20 21·4		
3	3 46 55	19 52·9	1·576	1·124
4	3 50 58	19 24·8		
5	3 54 55	18 57·0	1·616	1·150
6	3 58 46	18 29·6		
7	4 2 32	18 2·7	1·657	1·177
8	4 6 13	17 36·2		
9	4 9 48	+17 10·2	1·698	1·204

The ascending node of this comet falls at a radius-vector of about 2·36 in the region of the minor planets, the descending node at a radius-vector of 1·12, or 0·14 outside the earth's path; but, for the comet to pass at its least distance from our globe, the perihelion passage must occur about November 16.